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The question of establishing systems and procedures whereby institutions can teach more students faster and more efficiently is posed. The solution is that of developing a new concept in the design of a "systems" approach to the programing and utilization of instructional and learning resources. The value and purpose aspects of the "systems" concept, the methods of implementation and utilization which may be required to earn educational acceptance and support, and a design for its establishment are presented.

The task and function of a university is that of welding together imagination and experience. The new technology can realize and fulfill the nature of this learning experience by determining the character, nature, and quality of the educational experience required, and then by selecting and designing a combination of the resources which will produce the desired results. The "systems" plan is: determination of teaching-learning purposes and goals; selection of methods, media, and materials; and creative use of these resources in their application within the learning experience.

A method of implementing this systems plan within the structure of the educational institution is through an organizational or administrative structure which could be provided by a "Learning and Instructional Resource Center." This center would coordinate all resources available in the teaching and learning process.

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A "SYSTEMS" APPROACH TO THE CO-ORDINATION OF INSTRUCTIONAL AND LEARNING RESOURCES

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INSTRUCTIONAL TECHNOLOGY - U.S.C.

In the effort to determine what some of the possible and potential goals for higher education might be in a decade of decision, the question of establishing systems and procedures whereby institutions can teach more students faster and more efficiently (and I would add - better) has been proposed for examination at this session. The question, of course, comes out of the situation and problems which our schools and colleges will face with ever increasing intensity within the next few years - a rapid expansion in the number of students, a continued shortage of top quality teachers, a limit on available funds and facilities, and, because of these, a threatened loss in the quality of learning and instruction.

The solution implied in the subject for discussion is that of stepping-up the pace and improving the efficiency of the teaching-learning process; or, to put it perhaps on a little more comprehensive and educationally acceptable basis, that of developing a new concept in the design of a "systems" approach to the "programming" and utilization of instructional and learning resources. As Leslie Greenhill has expressed it: "The pressure of numbers should force us to make the maximum use of non-human teaching resources and to reserve the teacher for those aspects of the learning situation that cannot be mediated in any other way. Such a point of view would suggest the need for an operational analysis or a 'systems' approach to teaching and learning, which would be directed toward making the best possible integration of all kinds of teaching resources including the students themselves."[1]

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This idea and solution, of course, is not new; although there is a strong and present drive toward its realization and fulfillment. A drive which has been "sparked" by the National Defense Education Act and numerous Foundation grants. Perhaps the most persistent and provocative voice that has been raised in connection with the introduction of technology into the educational system, is that of James D. Finn. In fact, his articles on the nature and impact of the technological revolution have been a "cry in the wilderness" since at least 1955. We might entitle his efforts a kind of "Finn-egan's Awake," to play a bit upon Joyce; but the sleeping giant of Education has not shown much sign of deep awareness, or too much response to the stimuli, until quite recently.

This is not the time or place to review the numerous writings of Finn and others in connection with the impact of the new media and technologies upon our educational processes and procedures; because it would be too large a task for this assignment. However, I do recommend your personal investigation of the articles devoted to this problem in the Audio-Visual Communication Review and other professional educational journals, of the reports of research currently being carried out through NDEA grants under Title VII, and of the numerous publications and reports of the Ford Foundation projects in this area. These will provide you with a great deal of information, and a very clear picture of the issues, developments, potentialities, and problems.

What I hope to be able to do in the time allotted, and in keeping with the subject assigned, is to look into the value and purpose aspects of the "systems" concept, the methods of implementation and utilization

which may be required to earn educational acceptance and support, and to suggest a design for its establishment. As I see it, the three basic obstacles to establishing a "systems" approach to the educational problem of teaching more students faster, better, and more efficiently are: (1) the "good reasons for doing nothing"; (2) the analogical terms and arguments borrowed from industry; and (3) the identification of professional media people with methods, devices, and teaching aids. Before we can begin to establish the positive and constructive values of the technological resources available to us, we must meet and overcome these three hurdles. Therefore, let us turn our attention now to what steps we might take in this direction.

In obstacle number one, of course, we face the reality of the opposition to any new idea. An opposition that seems to be inherent in human nature and reflected in "good reasons for doing nothing." Edgar Dale has listed seven of these good reasons, that I'm sure we all recognize and have met on more than one occasion. They are: (1) "the proposal would set a precedent"; or, "there is no precedent to guide us"; (2) "we have not yet conclusively proved that the old method can't be made to work, or that the proposed new one can"; (3) "it's just another fad"; (4) "the time is not ripe"; (5) "the situation is hopeless"; (6) "we can't afford it"; and (7) "it is controversial."[2]

Any new plan, design, project or proposal will meet with some or all of these objections, which are designed to slow down, evade, or stop action. But, as Dale has pointed out, "they are <u>apparent</u> reasons not the <u>real</u> ones."[3] However, "apparent" though they may be, they are very real

and generally very effective in their employment against a new idea. We should recognize from the first that any planned technological development in education will have to overcome every one of these rationalizations which seem to constitute the basic "obstacle course" of human inertia. And, simply to argue that the new communications devices, methods, materials, and media exist and are here to stay, will not refute or overcome a single one of these objections. Each "good reason" must be met on its own ground and revealed for what it is - an "apparent reason," and an excuse to delay or avoid change, new learning, and the threat of insecurity. Once this is done, then perhaps, the positive values of the idea and the plan can be presented to give some persuasive meaning and purpose to the facts.

The second major obstacle, to the acceptance of technology and the "systems" concept, is the language and terminology used to describe and define it. This is a semantic problem; but it seems to me to be every bit as formidable and difficult as the "good reasons." Here again, the resistance and opposition are based upon value judgments derived from meanings and understanding, or in this case from mistaken meanings and consequent misunderstanding.

For example, the term "technology" itself is apparently loaded with negative implications when applied to education and the learning process. It is related in the minds of many to mechanical functions, mass production objectives, and quantitative results; having no relationship to human behavior, or allowing for such factors as uniqueness, differences, and qualitative values. This common connotation presents a very real problem; and the

conflict cannot be overcome, or a true understanding reached, by analogical arguments relating mass production to mass media, increased output to improvement in learning, and lower cost per unit to qualitative performance. Every effort, then, should be made to avoid the extension by analogy of the meaning of applied technology in science and industry, to the meaning of the utilization of new communications methods, techniques, and devices in the process of education. In short, the reasons for the acceptance and use of technology in education must be found within the purposes and goals of education, not by pointing to its existence and function within the processes of industry. To this end, it will be necessary to avoid such terms as automation, mass production, increased output, lower unit cost, and reduced labor requirements; because to most people in education, these spell mechanization, standardization, loss of quality, budget reduction, and elimination of teachers. This semantic problem and misunderstanding, which arises largely out of the common argument by analogy, therefore must be avoided or resolved through the use of terms and language that have acceptable educational value meanings and connotations, leading to proper understanding and intelligent acceptance, or technological advances will continue to be met by uncompromising resistance.

The third obstacle which must be overcome is the tendency of the professional communication specialists and experts toward preoccupation with the "gadgets" and devices. All too often these media and means become ends in themselves. Apparently, we love to "fool with the tools," and by their operation "confound the ignorant and amaze indeed the very faculties

of eyes and ears." This may provide great personal satisfaction through a feeling of superiority over the inexperienced and uninitiated; but it is the quickest and surest way to become identified as a "gadgeteer," a technician, and methods-centered. Once cast in this role, the communication expert is reduced to second-class educational citizenship and a strictly service function. He has cut himself off from purposes, ends and values, and has become identified with materials, methods, and techniques.

Once again the intelligent design and utilization of the communications media must be related to their purpose and value; and those who program, design, operate and administer these media must have this same concern and relationship. If the professional communication experts and specialists would serve as the "midwife" in the birth of the technological revolution in education, then they must be, or become, a first class citizen in the educational family and identify with the family purposes and values. Anything less than this will result in continued opposition and objection to the intrusion of this "new member"; which for some, will probably always be more "monster" than "messiah."

Whitehead has said that: "The task of a university is the creation of the future, so far as rational thought, and civilized modes of appreciation, can affect the issue."[4] Also, that: "The justification for a university is that it preserves the connection between knowledge and the zest of life by uniting the young and the old in the imaginative consideration of learning. The university imparts information, but it imparts it imaginatively. At least, this is the function which it should perform for society."[5] "Youth is imaginative, and if the imagination be strengthened by discipline this

energy of imagination can in great measure be preserved through life. The tragedy of the world is that those who are imaginative have but slight experience, and those who are experienced have feeble imaginations. Fools act on imagination without knowledge; pedants act on knowledge without imagination. The task of a university is to weld together imagaination and experience."[6]

If the task and function of a university is as Whitehead has described, then certainly the planned, intelligent, and purposive use of all available instructional facilities and learning resources should be a necessary and desirable part of this educational experience. The new media and all communication methods, systems and devices should be employed in the imparting of information in the most imaginative and stimulating way possible. Not for themselves, or because they are used in other processes and relationships, or as a substitute for other methods, but for the purpose of better learning, greater understanding, and a richer intellectual pleasure and enjoyment in the whole student-teacher relationship. As Arthur W. Foshay has pointed out: "The main educational question is: How many students learn to make ideas out of information? Inert fact is a curse because we tend to confuse having information with the ability to make responsible use of it. To 'know a lot' is not necessarily to be well educated, for the same reason that the retrieval of information is not thinking."[7] In this respect he is in agreement with Whitehead and the need for the <u>imaginative</u> communication of information - a process and a learning experience that links knowledge and life.

Now, how can the nature of this learning experience be realized and fulfilled through the use of the new technology? How can telephone

interviews with an outstanding authority be made a part of a learning situation? How can radio and television programs be designed and produced to provide information in a stimulating, and imaginative manner? How can film contribute to the students desire for greater knowledge? How can graphic and visual forms of presentation create a new depth of insight? How can "teaching machines" and "language laboratories" be designed and programmed to motivate the student to higher levels of achievement? These are the questions we should ask and answer if we wish to establish the positive values of the new technology, to overcome the obstacles to its acceptance, and to fit it into its proper place within the functions and purposes of our schools and universities.

The answers to these questions, it seems to me, can only come through the creative and imaginative use of the total complex of communications media and devices combined into a "systems" plan that will provide an opportunity to "program" their use and application for the purpose of better learning, or, in other words, to determine the character, nature and quality of the educational experience required, and then to select and design a combination of these resources which will produce the desired results. This determination of teaching-learning purposes and goals, selection of methods, media, and materials, and creative use of these resources in their application within the learning experience, is what I understand to be the meaning and intent of the "systems" plan. If this is true, then I believe that we can find a sound and proper place for it within the educational process, and perhaps succeed in teaching more students faster, better, and more efficiently. At least, it avoids identification with the mere function

of distribution, of gadgetry, and of methods and techniques; and, it does provide for the imaginative communication of information. Given this, the question then becomes one of how to implement it within the structure of the educational institution; so, let us move now to the consideration of a possible method by which this might be done.

First, we will probably need the device of an organizational pattern or an administrative structure. This could be provided through the establishment of what might be called a "Learning and Instructional Resources Center." This Center would encompass the whole communications and technological complex devoted to the learning and teaching process -- the library, instructional radio and television, film, graphics, audio and visual aids, language laboratories, and teaching machines. It would provide a professional and technical staff for the installation, maintenance, supervision, operation and production of these services. It would provide an academic staff for instruction in the media and their utilization, and for consulting and working in close co-operation with the teaching faculty of all departments. It would collect, analyze and make available all research findings and results relating to the use of the communications media. It would serve as a focus for research in all technological developments, and on the problems of more effective learning and instruction. And, it would provide the creative "programming" required for the full realization and application of the total "systems" concept and design.

The administrative head of the Center should be a Dean, or have some equivalent status. He would need to be well founded in the philosophy of education, the psychology of learning, the various communications media,

communication theory and processes, and the organizational structure and complex of educational institutions. He would work directly with the Deans of the academic colleges in the determination of the best methods and procedures of utilizing the Center's academic and professional staff and resources for the fulfillment of particular learning needs, and the solution of individual and collective problems of instruction. He would co-ordinate the Center staff and services in the effort to translate these instructional and learning needs into the specific programs and uses which would best realize the desired educational values and objectives.

Such a Center would provide what is basically a "team" approach to the problem of "operational analysis" and a "systems" design, that would be in direct keeping with Greenhill's suggestion of preserving the unique function of the teacher, and making maximum use of non-human teaching resources. It would bring the specialized knowledge and professional skills and experience of a number of experts, in a number of fields, to bear on each instance of educational need. And, in this manner, would provide the university staff with guidance and professional assistance in the organization of their information and material, in effective methods of demonstration and presentation, in the utilization of related materials and resources, and in the evaluation of student learning and achievement.

However, in order to carry out these functions and provide all these administrative and operational services, certain specialized physical facilities and requirements would be needed. For example, the Center services and resources should include: (1) closed-circuit radio and television production and recording studios; (2) film production and recording

studios; (3) graphic, photographic, and printing facilities; (4) film, kinescope, video and audio tape library and storage facilities; (5) language laboratories; (6) self-instructional materials and devices; (7) research and design laboratories incorporating new developments in learning resources and technical facilities; and (8) a campus-wide communications and distribution system, either direct wire or broadcast.

A central, co-ordinated, technical laboratory and learning complex of this scope and nature would certainly require a separate and special building, it seems to me. One which would make its operation efficient, feasible, and practical. One which would contain, combine, service and supply all the required materials and resources. One which would incorporate the latest and best in space design and adaptability, for maximum effectiveness in utilization. And one which, by its very nature and existence, would serve to express and implement the coordinated "systems" concept and operation. In addition to this special and centralized building, the Library, as a separate building, also should contain facsimile and closed-circuit TV origination and operation facilities, which, of course, would be tied into the common campus distribution system, as would additional language laboratories, or any other resource origination points, which might be desirable to establish in several campus locations in order to serve special needs.

This is certainly a very large order; and one that in all probability would be difficult to fill. However, the demands and needs are such that it is quite possible that some institutions will attempt to develop and establish such a "Learning and Instructional Resources Center" in the near future.

In fact, some schools are doing it gradually and progressively right now. Others are vitally interested, and are planning to start. In this age of technological emphasis, the "systems" approach to the co-ordination of all resources available in the teaching and learning process is rapidly becoming a fact. If we can accept this fact, base the development of the new technology upon the values, purposes and objectives of education, and firmly ground the system in the learning experience, then I believe that the obstacles to its acceptance can be overcome. And if by its development we can stimulate the "imaginative acquisition of knowledge," then we can help fulfill the basic function and purpose of our universities, and join with Whitehead in the "creation of the future."

(1) Greenhill, Leslie P., "Instructional Research, Whence - Whither?" The TV Educator, Part 2, No. 13, p. 3, GPL Division, General Precision, Inc., Pleasantville, New York, August 1, 1960.
(2) Dale, Edgar, "Good Reasons for Doing Nothing," The News Letter, Vol. 26, No. 3, December, 1960.
(3) Ibid, p. 1.
(4) Whitehead, Alfred N., Modes of Thought, p. 233, New York; Capricorn Books, 1958 (First printed by Macmillan in 1938).
(5) Whitehead, Alfred N., The Aims of Education, p. 97, New York, Mentor Books, 1955 (First printed by Macmillan in 1929).
(6) Ibid., p. 98.
(7) Foshay, Arthur W., "What is the Message," Saturday Review, Feb. 13, 1960, p. 35.